CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Basically the proponents of foreign direct investment (FDI) argue that FDI would stimulate growth so that savings and investment would also grow whereas critics of FDI argue that foreign investors, with their more advanced technology and larger capital base, would "crowd out" local investors both in terms of bidding for more lucrative projects as well as in utilizing local funds. In addition, savings would be reduced because of the drain of resources or outflow of funds through the repatriation of profits and the use of transfer pricing.

Thus, there is ongoing debate about the economic impact of FDI on host countries, especially developing economies. FDI may contribute significantly to growth and development in some circumstances, but may also have insignificant or even negative effects on the local economy in others. This debate assumed special importance in view of recent changes in the composition and direction of FDI and liberalization of government policies towards FDI in developing countries. Furthermore, FDI has proved to be resilient during financial crisis and this has lead many developing countries to favor FDI over other forms of capital flows.

In general, FDI is thought of as a composite bundle of capital stocks, know-how and technology, and hence its impact on growth is expected to be manifold and vary a great deal. The impact of inward FDI on the host economy will vary

between industries and countries. This study is on specific economies. Since the developing countries, are not homogenous, it is important to determine the effects of FDI on a single economy.

The relationship between FDI and growth and domestic saving may be complex and heterogeneous across countries. A strictly aggregative approach can often conceal significant regional differences. This study examines the possibility that the effect of FDI on growth and domestic saving could display quite heterogeneous behavior in the five selected ASEAN countries over 30 years.

As previously stated, the objectives of this study are to investigate the effect of FDI on five selected ASEAN countries, namely Indonesia, Malaysia, the Philippines, Singapore and Thailand. The study on the impact of FDI on growth and savings rates is two fold. To see clearly the relationship of FDI with growth and savings rates, a graphical analysis is done. Through this descriptive study using graphs, the impact of FDI on each of the 5 selected ASEAN countries during the year 1970-2000 can be examined on a year-to-year basis. It will show graphically the heterogeneous behavior of the effect of FDI on each country in this study.

To enhance this descriptive study, an econometric test using Ordinary Least Square (OLS) method is conducted on two macroeconomic models using single equations. The impact of FDI on growth and domestic savings is done using single equation models. Virtually all the empirical investigations into the causes and consequences of FDI use single-equation models.

This study uses single-equation models to empirically evaluate the 'direct' effect of FDI on the economic growth and domestic savings of these selected countries for the period between 1970-2000. By analyzing the overall differential impact of FDI on the five selected ASEAN countries, it will lead to several policy conclusions.

The study will also survey the trends and patterns of FDI in ASEAN during 1970-2000. It would also be useful to examine the role of FDI in bridging the savings-investment gap in the ASEAN countries.

3.2 The estimated model and specification

The model specification is as follows:

$$GR = a_0 + a_1 \Delta FDI + a_2 \Delta OFC + a_3 \Delta S + a_4 GRL + a_5 \Delta X + u_t$$

$$(a_1 >/<0) \quad (a_2 >/<0) \quad (a_3 >0) \quad (a_4 >0) \quad (a_5 >0) \tag{1}$$

$$S = a_6 + a_7 \Delta FDI + a_8 \Delta OFC + a_9 GR + a_{10} GRL + a_{11} \Delta X + a_{12} S_{t-1} + v_t$$

$$(a_7 >/<0) \quad (a_8 >/<0) \quad (a_9 >0) \quad (a_{10} >0) \quad (a_{11} >0) \quad (a_{12} > 0) \tag{2}$$

where

GR	=	growth rate of GDP
ΔFDI	=	change of foreign direct investment as percentage of GDP
Δ OFC	=	change of other foreign capital as percentage of GDP
Δ S	=	change in gross domestic savings as percentage of GDP
ΔX	=	change in export as percentage of GDP
GRL	=	growth rate of labor force
u, v	=	stochastic error terms.

The growth equation is the traditional export-augmented neoclassical production function (Rana 1985), and the saving equation is the traditional Keynesian-type saving function augmented by the export variable, labor and rate of growth. The export variable is included in the growth equation for at least four reasons. First, exports enable countries to specialize in the production of commodities in which they have a comparative advantage; resources which are saved in this way can then be used for investment. Second, trade provides a vent for surplus commodities which bring otherwise unemployed resources into use. Third, trade can expand production possibilities through its effect on such factors as competition, access to new knowledge, technology and ideas; these are the so-called dynamic gains from trade. Fourth, trade enables countries to purchase goods from abroad. If there are no domestic substitutes, the ability to import can relieve bottlenecks in production and thus increase savings and investment; imports may simply be more productive than domestic resources.

Export performance is also expected to influence the saving rate for several reasons. First, exports (especially of primary products) often produce highly concentrated income, and standard savings theory show that the propensity to save from such income is high (Papanek 1972). Second, countries whose export performance is good tend to face fewer foreign exchange constraints on investment and therefore tend to provide more of an incentive to save. Third, to the extent that trade taxes are a major source of revenue, exports tend to increase government savings.

The inclusion of the growth rate in the saving equation is fairly standard (Mikesekk and Zipser 1973). The growth rate variable is justified on the ground that rapid growth leads to changes in relative income and life-time consumption patterns and increases in transitory income in relation to permanent income; the former influences the saving rate more than the latter. The growth rate of labor (the participation rate) also contributes to the saving rate. The lagged saving variable is included to incorporate any adjustment lag

These two single-equation models consist of two endogenous variables (GR and S) and five exogenous variables (ΔFDI, ΔOFC, ΔX, GR, ΔS and GRL). The expected signs of the parameters are given in parenthesis below the equations. Given the controversy between economists, the sign of a_1 and a_2, and a_7 and a_8 could be either positive or negative. The hypothesis that all the explanatory variables used for these 2 models effects the growth rate and domestic savings rate of the 5 selected ASEAN countries are tested. For this purpose, the significance of the parameters of all the explanatory variables according to the expected signs is tested.

3.3 Methodology

The study on the impact of FDI on growth and savings rates is in two folds. First, a descriptive study using line graphs is carried out on the relationship between FDI, growth and saving rates between the period 1970-2000. This is done to analyze the impact of the change in FDI/GDP ratio on the economic growth and

saving rates of each of the 5 selected ASEAN countries in this study on a year-to-year basis.

The analysis on the graphs is presented on a country to country basis. A graph represented by two variables that is the change in FDI/GDP ratio (CFDI or $\triangle$FDI) and the growth rate (GR) of a country is analyzed to determine the relationship between the two variables. Then, an analysis on the impact of $\triangle$FDI on the GR is done on a year-to-year basis to indicate the years, which show positive impact, and the years, which show negative impact for the particular country. Finally, a general conclusion on the impact of $\triangle$FDI on GR is done. A brief explanation on the reasons for the change in FDI/GDP ratio from 1970-2000 for each country and the reason for the positive or negative impact of this variable on growth is also done. The same procedure is used to analyze the impact of $\triangle$FDI on the saving rates (SY) of the countries in this study from 1970-2000.

To enhance the graphical analysis, an econometric test using the Ordinary Least Square (OLS) method is carried out. This empirical study into the 'direct' effect of FDI on growth and saving use the two single-equation models above. These two models are then estimated using OLS method with time series data from 1970-2000.

If the estimated parameters of the explanatory variables indicate the expected sign and the adjusted R^2 adequately explains the variation of the dependent variable, the estimated model can be used for the testing of hypothesis. The size, sign and the significance of the FDI and OFC variables indicate the

strength and the direction of its effects on the economic growth rate and domestic savings rate.

The data series, which will be used to analyze the models, are also tested for stationarity. Any time series data should have been generated by a stochastic or random process and should be stationary for an estimation of a regression model to be meaningful. The Augmented Dickey-Fuller Unit Root Test will be used in this study

Data on FDI, OFC, S and X are scaled against GDP to avoid the heteroscedasticity problem. However, the FDI rate and OFC rate takes the lagged variables of one year. Thus, the investment is $\Delta FDI = FDI_t - FDI_{t-1}$ and $\Delta OFC = OFC_t - OFC_{t-1}$.